

## DENTAL ANXIETY, FEAR AND PHOBIA IN CHILDREN

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### ABSTRACT

Dental fear is one of the most common fear, which is classified as a specific fear according to Diagnostics and Statistics of Psychic Disorders DSM-IV. Dental phobia leads to avoidance of treatment, which in turn leads to deterioration of oral health. The anxious mood of a child prior to any frightening situation may affect a person's capacity for work and also affects the social activity. Children with dental fear avoid to address the Dentist in cases of neglected dental problems, be it the pain or swelling and this in turn affects the Dentists' work. The aetiology of dental fear has been discussed from various aspects, including the subject's inclination towards fear and anxiety and also a response towards certain specific stimulus. This article covers the entire process of the fear, anxiety and phobia portrayed by children.

**KEYWORDS:** Anxiety, Dental Anxiety, Fear, Phobia, Odontophobia

### INTRODUCTION

Fear is defined as an individual's response to real life threatening event or dangerous situation to protect his or her life.<sup>1</sup> Three different terms have been used which concerns about the possible apprehension: *dental fear*, *dental anxiety* and *dental phobia*. Dental fear is considered to be aroused by a real, immediately present, specific stimulus (e.g. needles, hand pieces), whereas for anxiety, the source of threat is unclear, ambiguous or may not be present immediately.<sup>2,3</sup> The elements of fear can be divided into two categories: *subjective* (includes emotions and cognitions) and *objective* (includes behavior and physiological reactions).<sup>1</sup> One of the most important channel for the child's behavior is the subjective experience of dental treatment to accept or to avoid treatment. Thus, it is imperative to understand the knowledge of a child's subjective dental fear rather than consider the objective dental fear; and development of these have to be based on the child's subjective feeling which must be given its due importance.

### Dental Anxiety in Children

Anxiety can be defined as a state of unpleasantness with an associated fear of danger from within or a learned process of one's own environment. It depends on the ability to imagine.<sup>4</sup>

Anxiety is one of the most common problems encountered in the dental operatory and is a source of challenge for the Pediatric Dentist; as many children who are extremely anxious totally avoid the dental examination and refuse the dental treatment. Dental anxiety is described as state anxiety as it occurs due to the dental treatment procedure and is related with negative expectations which are often linked to earlier traumatic experiences, negative attitudes in the family<sup>5</sup>, fear of pain and trauma and perceptions of an unsuccessful and/or a painful previous dental treatment.<sup>6</sup>

## Etiology

The etiology of dental anxiety is a highly debated topic and many theories are put forth. One such theory states that there are two groups of dentally anxious individuals; *exogenous* and *endogenous*. In the exogenous group, dental anxiety results from traumatic dental experiences or even vicarious learning; and in endogenous group, the individual has a constitutional vulnerability to the anxiety disorders as evidenced by general anxiety states.<sup>7</sup> The age of origin of dental anxiety is during childhood which continues to persist in later life too,<sup>8</sup> a view challenged by other authors.<sup>9, 10</sup> Ost *et al*<sup>9</sup> reported that almost 20% of dental phobics were in the age group of 14; similarly, Milgrom *et al*<sup>10</sup> reported that 33.3% of the individuals whom he studied, became anxious during adolescence and in adulthood. The nature of dental anxiety is more often related to age of onset; and it is believed that child-onset subjects are more often exogenous and the later-onset individuals are more likely to be endogenous.<sup>7</sup>

## Prevalence of Dental Anxiety

Dental anxiety affects people of all age groups and from all backgrounds. Numerous studies have documented the prevalence of childhood dental anxiety. Folayen *et al*<sup>11</sup> reported a worldwide prevalence of 3 to 43%, Bedi *et al*<sup>12</sup> reported a prevalence of 7.1% in Scotland and Morgan *et al*<sup>13</sup> reported a prevalence of 10.5% for USA.

## Challenges of Dental Anxiety

Dental anxiety poses immense challenge to dental care. Even adults experiencing high levels of dental anxiety have the poorest oral health-related quality of life in Britain.<sup>14</sup> Further, most of the dental pathological conditions are found in highly anxious children,<sup>15</sup> and Klinberg *et al*<sup>16</sup> showed that dental anxiety in children is associated with total avoidance of dental care with highly carious teeth and behavior management problems. Management techniques include sedation, general anaesthesia and hypnosis.

## Causes of Dental Anxiety

Dental anxiety is a multidimensional complex phenomenon and some of the factors that have been enlisted in the literature includes Personality Characteristics, Fear of Pain, past traumatic dental experiences,(conditioned experiences); the influence of dentally anxious family members or peers who can elicit unwanted fear in a person (vicarious learning) and lastly the fear of blood-injury.<sup>10, 17-22</sup> Several studies have proved that most of the potent triggers are from the procedures of restorative dentistry which can be due to sight, sound and the vibrational sensation of dental drills,<sup>18, 23, 24</sup> coupled with the sight and sensation of a local anaesthetic injection.<sup>18, 24, 25</sup> Thus, it is imperative that anxious patients who are to undergo any restorative procedure must be managed by using the “4S” rule which aims to reduce the stress triggers, sights of needles and drills, sounds from drilling and any possible sensations which may be due to high frequency vibrations coupled with a high annoyance factor and lastly any smell possibly from eugenol or bonding agents. Some possible modifications in the form of Atraumatic restorative technique, incorporation of ultra-low speed cutting, use of chemo-mechanical caries removal etc. can be effectively used in such anxious patients to wean them away from anxiety.

One critical factor which can trigger anxiety can be the aspect of Dentist-Patient interactions, possibly from the statements made by the Dentist,<sup>23</sup> which may happen in an unlikely scenario of when they are angry or in case of condescending comments.<sup>18</sup> The other possible triggering factor may be the time spent waiting for dental treatment thus inducing a chain reaction in the patients mind about what will or what could happen next and also to ponder about the worst-case outcomes.<sup>24</sup>

## Consequences and Complications of Dental Anxiety

Dental anxiety has been strongly associated with poor oral health.<sup>27</sup> Eitner *et al*<sup>23</sup> reported that the avoidance of the dental treatment was high in dentally anxious patients and they also had increased caries morbidity and DMFS scores. The long-term consequences for the dentition explains about the role of dental anxiety which leads to increased use of antibiotics and analgesics.<sup>2</sup> Dental anxiety apart from affecting the patient's oral health also has a large impact on the individual's life<sup>24</sup> and also evokes physiological responses of the "Fright or Flight" type, which can cause a feeling of exhaustion after a dental appointment. Some of the cognitive impacts of dental anxiety include negative thoughts,<sup>28</sup> fear, crying, and aggression, disturbances in sleep and eating patterns and also use of self-medications.<sup>24</sup> The other problems commonly encountered by dentists include reduced satisfaction with the treatment offered or planned and as the patients perceptions of the dentists' competence decreased, their dental anxiety also increases.<sup>29</sup>

## Psychological Basis

Psychological theories provides a framework to judge children's reaction to dentistry, analyse their anxiety responses and possibly look at the role of learning in response to dentistry.

### The Freudian Theory of Anxiety

The concept of anxiety and its effect upon the human behavior was first studied by Freud, who described anxiety as a painful emotional experience produced by excitations of the internal organs of the body, and these excitations occur through internal or external stimulation of the body and are governed by the autonomic nervous system. Following are the three types of anxiety.

- **Reality Anxiety:** Here the source lies in the external world, for e.g. Fear of insects or snakes etc. The perception of threat from the external world could be innate or acquired as in the case of darkness which could be innate and has always been more dangerous to mankind than daylight; however it could be both in some scenarios due to an interplay of genetics which may produce a susceptibility to fear darkness and experience may transform this susceptibility into reality.
- **Neurotic Anxiety:** Here the source is the instinctual object choice of the Id, for e.g. a person becomes afraid of some uncontrollable urge that results in his/her harm; and this may be either through an act or a thought. This further manifests in three types, (a) free floating apprehensiveness which attaches to any more-or-less suitable environmental circumstances and is a characteristic of "nervous" people who expect the worst in any situation; (b) Phobias, where the fear intensity is manifested out of proportion to the threat presented and (c) Panic reactions, where the impulse reactions need to be carried out to stop a person "exploding" (i.e. where the Id exerts power over the ego and super-ego).
- **Model Anxiety:** Here the source is the conscience or superego; thus a person is afraid of being punished for doing or thinking something contrary to the ego ideal. Here the feelings are manifested as feelings of guilt or shame in the ego. Further, since the super-ego is derived from parental values, it can be seen that the source of original fear from which the moral anxiety is derived is primarily objective, i.e. from the fear of punitive parents.

From the Freudian perspective, all fears are acquired during infancy and early childhood, when the young organism is strongly overwhelmed by fear, since ego has not developed during this stage. Such situations often reduce the organism to infantile helplessness, the typical example being the birth trauma where the organism is bombarded with excessive stimulation on entering a world that the protected fetal environment has not prepared him/her for. This theory of

anxiety is the starting point from which various psychological theories of anxiety have been developed. The major problem with this theory is that it does not evaluate satisfactorily the nature of fears; and this has led to the development of behavioural theories of anxiety.

### **The Behavioural Paradigm**

The behavioural model of fear acquisition is based on the behavioural paradigm for the acquisition of all behavior. Majority of work in this area is based on the works of Pavlov (1927) and Skinner (1938), who used animal experiments for their studies. The highlights of these studies are:

- **The Classical Conditioning Model:** This was outlined by Pavlov in his classic bell and food experiment. When adapted to the present day scenario, this model of behavior is inadequate to explain the wide range of human behavioural responses; which may be due to these reasons, firstly, the vast majority of experiments have been carried out on experimental animals in a controlled laboratory setting thus controlling all non-essential variables and extrapolation to human behavior and secondly, there may well be a classical conditioning component in dental anxiety where the range of variables which are associated with the development of such anxiety makes the task of deciding how the classical conditioning took place.
- **The Instrumental Conditioning Model:** Was outlined by Skinner in 1938; this theory accounts for the acquisition of new behavioural patterns which later on affect exposure to future stimulus. From this model, the Unconditioned Stimuli which are in the paradigm, the responses elicited are termed as Unconditioned Responses and they fall into two general classes; *Reinforcers* and *Motivators*. These secondary reinforcing and punishing stimuli have played a key role in the theory of emotions.

To summarise the behavioural paradigm, Pavlov's work was further extended by Skinner in order to account for a greater range of behaviours; and by using a combination of classical and instrumental models an integrated models an integrated formula of the occurrence of emotions as 'hope' and 'fear' can be outlined.

### **Other Psychological and Physiological Theories of Anxiety**

May (1950)<sup>30</sup> described anxiety as the apprehension cued off by a threat to some value which the individual holds essentially to one's existence as a personality. May added that, the particular events or stimuli which evoked anxiety are largely determined by learning rather than impulses. An anxiety reaction is deemed to be normal if it is proportionate to the objective danger and does not involve repression or any other defense mechanism; neurotic anxiety reactions are disproportionate to the objective danger and involve repression and neurotic defenses. Anxiety is also viewed as an intensely unpleasant state of tension arising from experiencing disapproval in interpersonal relations; e.g. an empathic mother induces the tension and anxiety to her infant with her motherly empathic linkage and once aroused, the anxiety distorts the individual's perception of reality and also limits the ranges of stimuli that are perceived. Today, anxiety is viewed as an unpleasant emotional state, which is characterised by subjective feelings of tension, apprehension and worry; and by activation or arousal of the autonomic nervous system.<sup>31-33</sup> More recently, there has been an upsurge on newer theories which have explained individuals with anxiety disorder experience heightened physiological arousal when they encounter stressful or any social situation, which they interpret as an indication of danger or anxiety.<sup>34</sup> Anderson and Hope<sup>35</sup> also noted that such an interpretation of physiological arousal leads to increased symptoms of anxiety among individuals with anxiety disorder; and these perceptions about the dangers of physiological arousal may maintain anxiety symptoms as individuals learn to avoid threatening or stressful situations in order to evade such physiological arousal.

## State versus Trait Anxiety

Cattell and Scheier<sup>36</sup> identified two distinct anxiety factors, namely state anxiety and trait anxiety; state anxiety factor was based on a pattern of variables, defining a transitory state or condition of the organism which fluctuated over time, and trait anxiety was interpreted as measuring stable individual differences in a relatively permanent personality characteristic. Spielberger<sup>37, 38</sup> referred state anxiety as an empirical process or reaction which is taking place at a given level of intensity; characterised by subjective, consciously perceived feelings of apprehension and tension, accompanied by or associated with activation of the autonomic nervous system. In contrast, trait anxiety indicates a latent disposition for a reaction of a certain type to occur if triggered by appropriate or stressful stimuli.

Anxiety as a personality trait implies a motive or acquired behavioural disposition that predisposes an individual to perceive a wide range of objectively non-dangerous circumstances as threatening, and to respond to these with anxiety state reactions disproportionate in intensity to the magnitude of the objective danger. Trait anxiety measures reflect anxiety proneness i.e. differences between individuals in the probability that anxiety states will be manifested under circumstances involving varying degrees of stress.<sup>39</sup>

Lazarus and Averill<sup>40</sup> regarded anxiety as a complex emotional syndrome consisting of unpleasant cognitive and affective states and physical arousal as basic components. Cattell<sup>41</sup> regarded the response pattern in state anxiety as a fundamental emotion and from a unitary source state and Izard<sup>42</sup> contended that anxiety is a complex but unstable reaction consisting of variable combinations of other basic emotions such as fear, distress and shame.

## Dental Fear

Dental fear is defined as a specific anxiety, i.e. it is the predisposition for a negative experience in the dental surgery.<sup>43</sup> Dental fear is one of the most common fears, which is classified as a specific fear according to Diagnostics and Statistics of Psychic Disorders DSM-IV.<sup>44</sup> The elements of fear are of two categories, the subjective (which includes emotions and cognitions) and the objective (includes behavior and physiological reactions).<sup>1</sup> The patient's subjective experience of the dental treatment becomes the most important channel for the child's later behavior. Therefore, a thorough knowledge of patient's subjective fear is more relevant than the knowledge of objective fear for considering the child towards dental treatment and this development has to be based more on the patient's subjective feeling which ought to be respected.

Dental patients cause undue stress to dentists, which may persist even after the working hour; and this is more so in the case of Pediatric Dentists whose patients bring about many stressful situations due to their age and also the behavioural patterns.

## Etiology of Dental Fear

The etiology of dental fear has been discussed from various aspects, including the child's inclination for anxiety and fear, and a response to certain specific stimulus. Majority of the patients associated dental fear with past painful experiences during their childhood<sup>10, 45, 46</sup> and from negative staff behavior.<sup>47</sup> Fear is an individual's emotional response to perceived threat or danger; it is based on self-protection, has a defensive character and also brings about physiologic changes, which primarily involves tachycardia, profuse perspiration, muscle tension, and even gastrointestinal symptoms.

## Classification of Dental Fear

Dental fear falls into the category of specific fears. In 1985, Milgrom<sup>48, 51</sup> classified dental fears into groups according to Seattle System:

- Conditioned fear of specific painful or unpleasant stimuli (drills, needles, sounds, smells etc.)
- Anxiety about somatic reactions during treatment (allergic reactions, fainting, panic attacks, death)
- Patients with other complicating trait anxiety or phobic symptoms
- Distrust of dental personnel

This classification shows that dental fear is a polyetiological phenomenon that is caused not only by pain experienced during dental treatment, but also by personal qualities and communication skills between the patient and the dental staff.

### **Origin of Dental Fear<sup>49-51</sup>**

The origin of dental fear may be divided into three main categories:

- Personal factors (age, general fears and anxiety, temperament etc.)
- External factors (parents with dental fears, family social status, upbringing etc.)
- Dental factors (pain, behaviour of dental staff)

This classification resembles the Seattle system, but unlike that system, this indicates age, parents' dental fears and upbringing among other factors determining dental fear.

As dental fear is a precursor of poor oral health along with other psychological and financial problems, it becomes essential to distinguish the reasons for avoidance of necessary dental treatment.

### **Models of Dental Fear Acquisition**

Freeman<sup>52, 53</sup> applied psychodynamic theory in order to understand dental anxiety and phobias in children; realistic anxiety is a rational fight, flight or fight reaction associated with external dangerous situation, Neurotic anxiety can be a response to internal danger and represents a danger to the self and the internal dangers experienced by the child can be associated with fears arising from loss of parents, fear of self-injuries, and helplessness which then displace or foist into the dental treatment situation. Therefore, child anxiety can be a neurotic anxiety which might have some 'threat' consequences of an internal danger based on the child's imagination about what would happen next during dental treatment and any possible treatment can precipitate emotional reactions that furthers anxiety attacks. If the child was able to cope up with anxiety, he will continue to accept the dental treatment; however, if the child does not cope, he might refuse treatment, have a panic attack or totally refuse dental treatment, and the dentist will be perceived as the perpetrator of internal danger.<sup>54</sup>

There are two major factors involved in the development of dental fear; the child's previous untoward experience and also the child's perception of whether or not they could overcome this fear. Weiner and Sheehan<sup>55</sup> categorised dental fear into endogenous and exogenous varieties; the endogenous refers to internal personality vulnerabilities related to anxiety disorders (evident in generalised anxiety and panic disorders) and the exogenous variant refers to direct or vicarious conditioning through traumatic experiences (as evident from dental treatment). Rachman<sup>56, 57</sup> in his model of acquisition of dental fear, noted that there are several pathways to fear acquisition, and in addition to the direct conditioning responses, both vicarious learning and information lead to fear. **Table 1** represents the three pathways as explained by Rachman. Traditionally, Rachman's model of fear acquisition is most often used to explain the acquisition of dental fear as it encompasses various other models.

## Determinants of Dental Fear

- Gender: still controversy exists regarding the role of gender. Few authors<sup>58,59</sup> have found no gender differences in children's and adolescent dental fear, whereas others<sup>60-63</sup> reported that girls were more fearful. Neverlein<sup>64</sup> reported in his study that the component of dental fear was more in adolescent girls than in boys. Murray<sup>65</sup> reported from his longitudinal study that when self-efficacy, fear of danger and death and the number of dentists visited were checked for, the girls, reportedly had peer ratings and medical fears which can be predictors of dental anxiety and the boys with dental fear or anxiety may be more responsive to stress during treatment.
- **Psychosocial Factors:** personality traits differ in children with and without dental fear and is directly related to general fear, low self-esteem, shyness and timid nature, and pessimism and exhibiting negative emotions.<sup>60,66</sup> Gustafson<sup>67</sup> reported from his study that children from low socio-economic strata participated in less leisure activities and had worst social interactions.
- **Age of Fear Acquisition:** the prevalence of fear differs from 6% to 56%.<sup>10,60</sup> The other determinants for this are previous frightening experiences which could either have been painful or embarrassing and also a previous history of dental anxiety. The developmental stage of a child also plays a role on the development of fear.<sup>11,60</sup> and the younger children in their pre-operative period, do not cope with the dental treatment.<sup>60,68</sup> Piaget<sup>68</sup> further added that the child can only focus on the perceptual dimension and doesn't co-relate it with natural situations as the perceptual illusions are predominant over logical reasoning. As the age of the child advances, children become more receptive as their cognitive skills have developed; they learn to comprehend various differences to their treatment.

## Dental Phobia

A phobia is an irrational fear of an object/situation that would not normally trouble most people or it can be a persistent, unrealistic and intense fear of specific stimulus, leading to the avoidance of the perceived danger. The avoidance often causes significant distress or interferes with social functions. A phobia may be a social phobia or a specific phobia; a social phobia may be a fear of being observed doing something humiliating or embarrassing, e.g. in a dental setting, a fear of vomiting as a result of excessive gagging and a specific phobia is a fear associated with a particular object or situation. According to the DSM-IV, dental phobia (other synonyms include odontophobia, dentophobia or dentist phobia) is one of the specific phobias.

Ivanovcategorised neurotic dental phobias into:

- **Simple Phobia-** The fear felt is caused by the machine or the dentist
- **Complex Phobia-** The fear is induced by the entire dental surgery (dental chair, machine and the dentist); this can grow into a panic disorder.
- **Phobic Crisis-** The trigger can be an object, a thought, an image or any other stimuli which can lead to intense focussing of sub consciousness and triggering a strong reaction of fear which can escalate to panic and is accompanied by sweating, palpitations, faintness etc.

The diagnostic criteria of specific phobia includes:

- A marked and persistent fear of the specific object or situation that is excessive or unreasonable
- An immediate anxiety response upon exposure to the feared stimulus, which may take the form of a panic attack

- Recognition of the fear is excessive or unreasonable
- Avoidance of the anxiety-producing situation
- The phobia interferes with normal functioning or causes marked distress

### **Factors Involved in Dental Phobia**

- **General Factors**-includes anxiety, guilt, shame, embarrassment and loss of self-esteem. This may also include a fear of letting someone even see their teeth or afraid of what the dentist's reaction will be about the condition of their teeth. Many-a-times, it is the embarrassment which is the primary concern probably because they may be self-conscious about how their teeth look. The mouth is an intimate part of the body and people feel embarrassed to let some stranger look at their teeth. A ‘vicious cycle’ of the dentist lecturing, and let somebody observe patients mouth exists in dental phobia, leading to avoidance, which finally means no access to professional dental care, resulting in poor oral health and at times totally avoidance of the dentist even in times of excruciating pain.
- **General Needle Phobia**- Needle phobia or ‘belenophobia’ can be so severe in some cases so as to treat the patient under sedation procedure. However with modern medicine, the issue of needle phobia is raising at an alarming rate. Lamb in 2006 categorised four possible categories of needle phobia: vaso-vagal, associative, resistive and hyperalgesic.
- **Dental Needle Phobia**- ‘it is ironic that the very procedure that allows patients to be treated virtually free of pain is the one that they often fear the most’<sup>2</sup> Milgrom<sup>2</sup> added that once the initial consultation is established, care should be taken regarding the patient’s concerns with the needle be it in isolation or when combined with other specific or general factors.
- **Adverse Reactions to Local Anaesthetics**- includes allergic reactions, systemic toxic reactions, psychogenic effects or drug interactions.<sup>2</sup> Routinely, the adverse effects that follow a dental injection are due to somatic manifestations of fear and phobia and includes nausea, sweating, pallor, tremor and even fainting. Here it should be emphasised that this is not an allergy and that there is no need for a change in the anaesthetic agent.
- **Blood Phobia**- can be from the sight of own blood or the images of blood; and in a dental setting, it is more likely to result in anxiety during procedures of tooth removal. Blood phobia is different from the other specific procedure phobias, here the typical response being a drop in blood pressure and heart rate accompanied by fainting. There is still a degree of reflexive defensive response that serves to reduce blood loss and also cause immobility in an eventuality of injury. Further, the usual approach to specific phobias, be it the desensitization or any other relaxation-based techniques are quite helpful.

### **Model of Phobia Acquisition**

The dental phobia may be the result of learned association between pain and dentistry; and multiple exposures to traumatic experiences may be needed for development of a phobia. The Pavlov’s or classical conditioning is still widely accepted as a significant cause of phobia. For e.g. CS: dental procedure in dental surgery (no fear from child, and no previous painful experience); US: painful experience with procedure and UR: fearful response. Repeated exposure to CS leads to CR (dental procedure leads to a fearful response).

- **Modelling**- phobia develops by observing another individual’s fearful response to an object/situation, especially if the individual is a family member; and many a times, the relatives of dentally anxious patients had more negative

attitudes to dentistry themselves.

- **Cognitions-** ideas, thoughts and beliefs may develop and can be the sole etiology of the phobia. Some hearsay stories about dental treatment or a similar procedure shown on television leads to the development of phobia.
- **Biological Differences-** some people believe that they have lower pain thresholds (possibly due to biological differences)
- **Expectation-** anxiety and expectation affects pain tolerance and threshold
- **Uncertainty-** may sometimes lead and provoke to phobic transformation.

## CONCLUSIONS

Dental anxiety, fear and phobia are universal problems affecting large pediatric and to some extent even adult population in all places. This cycle of problem results and leads to avoidance of dental care which in turn leads to severe caries and periodontal diseases thus grossly affecting the patient's general wellbeing and a compromised oral health

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## APPENDICES

**Table 1: The Three Pathways Leading to Fear Suggested by Rachman**

Pathway	Direct Conditioning	Vicarious Learning	Informational Pathway
Explanation	Negative response initiates fear through classical conditioning i.e. an unconditioned stimulus might cause conditioned response (dental fear)	Acquisition of dental fear by observing the parents	Information from environment may cause fear in some patients
Examples	A painful experience of tooth drilling without the use of local anaesthetic	Observing parents fearful behavioural response during their dental treatment.	Any negative response or information regarding dental treatment from parents, peers and media.

